Installation Instructions
LM4L MVOLT Switching and 0-10V Dimming Module

READ AND FOLLOW ALL SAFETY INSTRUCTIONS!
SAVE THESE INSTRUCTIONS AND DELIVER TO OWNER AFTER INSTALLATION

IMPORTANT SAFEGUARDS

When using electrical equipment, basic safety precautions should always be followed including the following:

READ AND FOLLOW ALL SAFETY INSTRUCTIONS.

- Do not use outdoors.
- Use only indoors in dry, relatively clean, non-condensing humidity environments.
- Do not mount near gas or electric heaters.
- Equipment should be mounted in locations and at heights where it will not be subjected to tampering by unauthorized personnel.
- The use of accessory equipment not recommended by the manufacturer may cause an unsafe condition.
- Do not use this equipment for other than its intended use.

SAVE THESE INSTRUCTIONS

To reduce the risk of death, injury or property damage from fire, electric shock, cuts, abrasions, falling parts, and other hazards:

- Service of the equipment must be performed by qualified service personnel.
- Installation and maintenance must be performed by a person familiar with the construction and operation of this product and any hazards involved. All applicable codes and ordinances must be followed.
- Read this document before installing, servicing, or maintaining this equipment. These instructions do not cover all installation, service, and maintenance situations. If your situation is not covered, or if you do not understand these instructions or additional information is required, contact Acuity Controls.

WARNING

Before installing, servicing, or maintaining this equipment, follow these general precautions.

To reduce the risk of electrocution:

- Make sure the equipment is properly grounded.
- Always de-energize any equipment before connecting to, disconnecting from, or servicing the equipment.

To reduce the risk of fire:

- Use supply conductors with a minimum installation temperature rating as specified.

To reduce the risk of personal injury from cuts, abrasions:

- Wear gloves to prevent cuts or abrasions from sharp edges when removing from carton, handling and maintaining this equipment.
- Do not install damaged equipment.

Acuity Controls, a division of *Acuity Brands* Inc., assumes no responsibility for claims arising out of improper or careless installation or handling of this product.

SAVE THESE INSTRUCTIONS

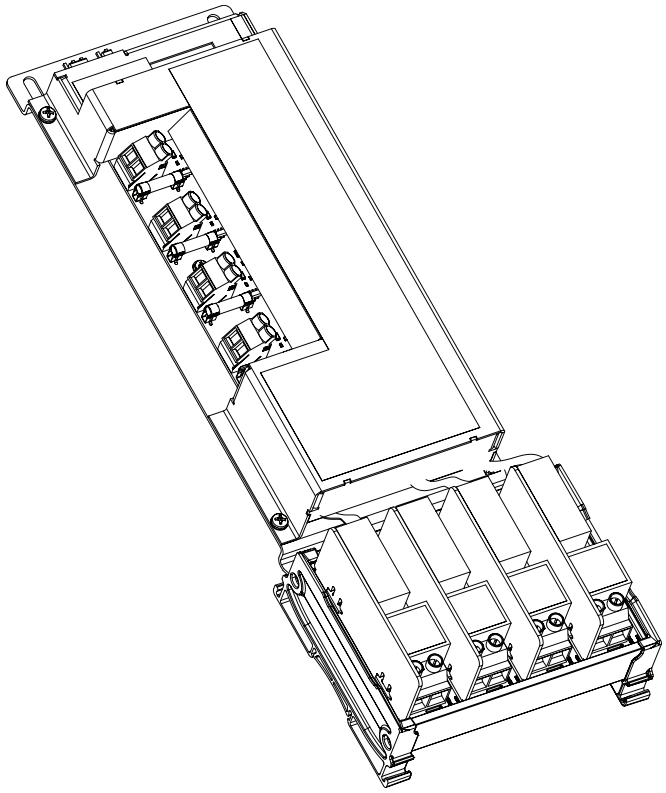
 © 2014-2015 Acuity Brands Lighting, Inc. All rights reserved. 08/20/15

Installation Instructions
LM4L MVOLT Switching and 0-10V Dimming Module

The LM4L switching and dimming module can dim 0-10VDC ballasts and LED drivers and switch (non-dim) loads of any type. Each relay/dimmer is independent of the others and each circuit can be either dimmed or switched allowing greater flexibility in load distribution. The LM4L is intended for use with 120-277V, 50/60Hz circuits. See below for full details.

Important Module Information

1. Ambient Conditions:
   Maximum Ambient Temperature: 104°F/40° C
   Minimum Ambient Temperature: 32°F/0°C
   Relative Humidity:10-90% Non condensing
2. The LM4L MVOLT module is rated for 120-277V, 50/60 Hz operation.
   Maximum ratings:
   Max sink current per 0-10VDC output: 100 mA
   Max relay ratings per circuit:
   20 Amps @ 277V Resistive/Magnetic
   16 Amps @ 277V Electronic ballast/driver
   20 Amps @ 250V Tungsten
   20 FLA @ 120V Motor Load
3. Verify that the load type being connected is compatible with the dimmer module type and capacity as listed on the module label.
4. Test all branch circuits for short circuits prior to energizing the module.
5. Use only copper conductors with 90°C insulation rating or higher.
6. Dimmer output terminal block specifications:
   (1) #10, #12, or (2) #14 AWG conductors maximum.
8. Each LM module is bonded to the mounting surface using the (2) supplied #8-18 x 5/16" type B serrated mounting screws. Both screws must be used and torqued to a min 24 inch-lbs to insure a good ground. If these screws are lost replace ONLY with screws of this type to insure proper grounding.



LM4L MVOLT Module

Table 1 - LM4L MVOLT Module Output Ratings

Four 120/277V CIRCUITS
20 Amps @ 277V Resistive/Magnetic
16 Amps @ 277V Electronic ballast/driver
20 Amps @ 250V Tungsten
20 FLA @ 120V Motor Load

LM4L Compatible Load Types

LM4L MVOLT Compatible Load Types
- All 120/277VAC, 50/60Hz non dimmed
- 0-10V (IEC 60929 compliant devices)
  - LED 0-10V dimmed
  - Fluorescent 0-10V dimmed
  - HID 0-10V dimmed

NOTE: The LM4L module will delay switching operations for approximately five seconds after it is initially powered. During normal operation, it will limit the relay open and close operations to an average of one per second. If this average rate is exceeded, the module may delay a requested operation for up to five seconds.

 © 2014-2015 Acuity Brands Lighting, Inc. All rights reserved. 08/20/15

Installation Instructions
LM4L MVOLT Switching and 0-10V Dimming Module

Before You Start

1. Disconnect power prior to installation or servicing.
2. Install in accordance with the National Electrical Code and any other codes which may apply.
3. Use only as intended.
4. Use only accessories recommended by Acuity Controls.
5. Use only at the voltage listed on the product and component labels.

Relay Connections

The load circuits the relays are controlling can be fed in 1 of 2 ways:

1. From breakers in a separate breaker panel. Using breakers in a separate breaker panel allows for fully loaded circuits to be controlled per relay.
2. From a branch breaker in the LMP panel. A single LMP branch breaker can feed 1, 2, 3, or all 4 relays of an LM4L module. The combined load total must not be more than the rating of the LMP branch breaker (16A or 20A).

See Figures 5, 6 and 7 for typical details.
Relays in LMP ML (Main Lug) panels can be fed by either method.
Relays in LMP FT (Feed Through) panels must be fed by breakers from a separate breaker panel.

Fused Dimming Outputs

Each 0-10V dimming output is protected by a replaceable glass fuse. See Figure 1 for details.
USE ONLY 650mA, 250V, 5x20mm fuses.
To replace a fuse, remove it by prying it out of the fuse holder. Install the new fuse by pushing the new fuse into the fuse holder. **Be careful to not allow a loose fuse to fall into the module.** If this happens remove the module, turn it upside down and shake until the fuse falls out.

DO NOT LEAVE LOOSE FUSES INSIDE THE MODULE! SHORT CIRCUITS MAY OCCUR!

WARNING!
A blown fuse may have line voltage present! Blown fuses indicate line voltage was mis-wired to the 0-10VDC output(s)!

Module Installation and Wiring

1. MOUNT THE MODULE(S)
   Mount the LM4L module by inserting the mounting tabs into the slots in the back of the enclosure. Secure it with the (2) mounting screws provided.
   See Figures 1 and 3 for details.
2. MOUNT THE RELAY ASSEMBLY
   Mount the relay assembly by snapping it down onto the DIN rail.
   See Figures 1 and 3 for details.
3. CONNECT THE RELAY RIBBON CABLES
   Each relay uses a ribbon cable for communication to the module circuit board. Connect each relay ribbon cable to the circuit board.
4. CONNECT THE MODULE DATA NETWORK
   Connect the module data network connector to the 3 position terminal on the side of the LM4L module.
   See Figures 1 and 2 for details..
5. CONNECT THE MODULE POWER
   Connect the module power connector to the 2 position terminal on the side of the LM4L module. See Figures 1 and 2 for details.
6. Repeat steps 1, 2, 3 and 4 for additional modules.
7. CONNECT THE RELAY WIRING
   Connect the relay input lug(s) to either a branch breaker in the LMP panel, or to a breaker(s) in a separate breaker panel. See Figures 5, 6 and 7 for typical details.
8. CONNECT THE LOAD WIRING
   Connect the relay output lug(s) to the load circuit(s) being controlled. See Figures 5, 6 and 7 for typical details.
9. CONNECT THE 0-10VDC CONTROL OUTPUT WIRING
   Connect the control wires of the ballasts/drivers to the appropriate dimmer output terminal block of the LM4L. See Figure 7 for typical details.
10. OVERRIDE RELAY(S) TO ON IF DESIRED
    See Figure 1 for details.

0-10V Dimmers are rated for Class 2 or Class 1 operation. Class 2 is recommend to minimize the possibility of coupled noise or other performance issues.

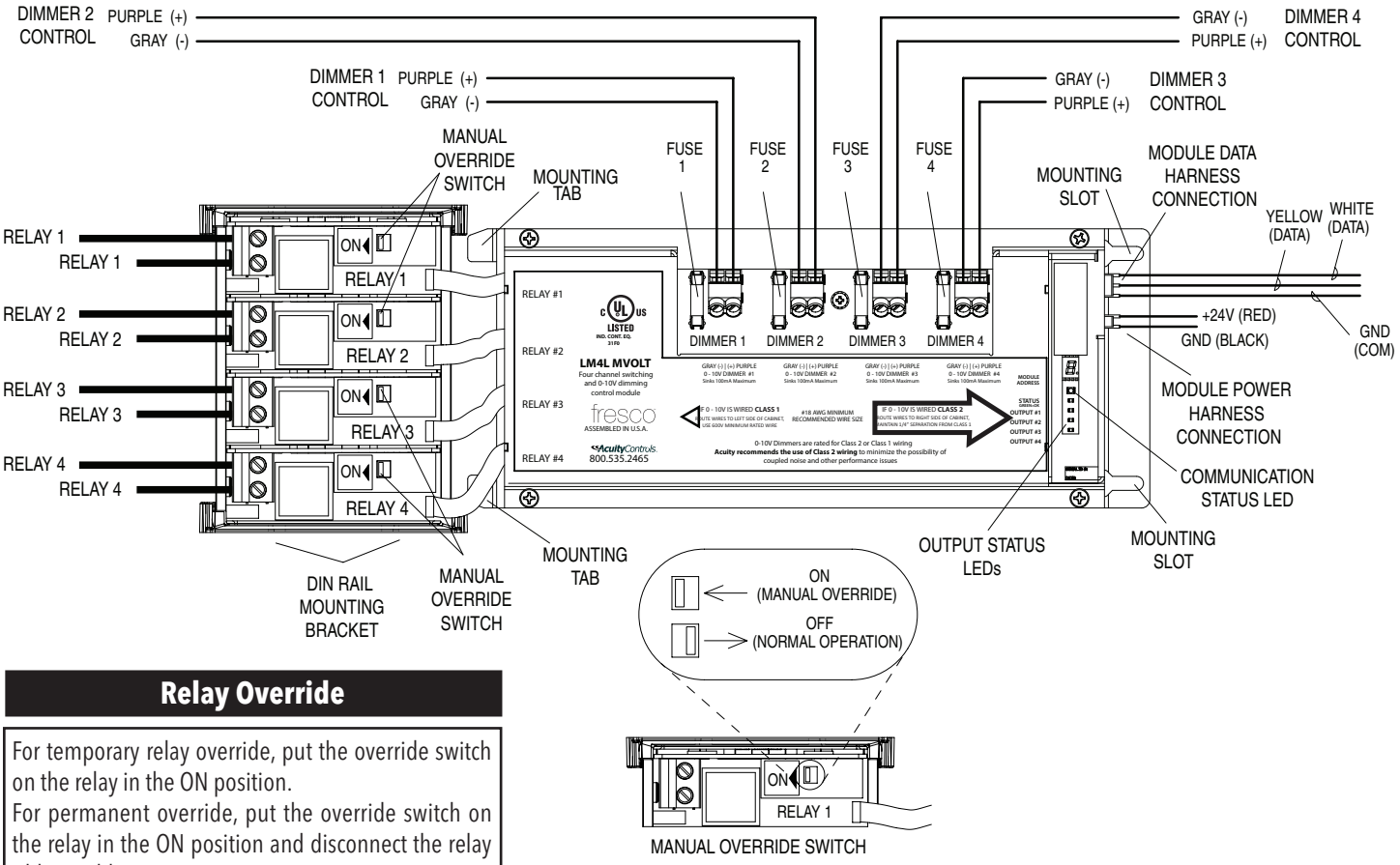
Use of Class 1 wiring is not recommended!

- If 0 - 10V is wired class 2, route wires to the right side of cabinet. Maintain 1/4" separation from class 1.
- If 0 - 10V is wired class 1, route wires to the left side of cabinet. Use 600V minimum rated wire.

Note: Use appropriately sized conductors.
Torque all terminal block screws to 5.3 inch-lbs
Test for short circuits prior to energizing load!

10. MODULE CONFIGURATION
    Modules are fully programmable using a Fresco Touchscreen station.

 © 2014-2015 Acuity Brands Lighting, Inc. All rights reserved. 08/20/15



Relay Override

For temporary relay override, put the override switch on the relay in the ON position.
For permanent override, put the override switch on the relay in the ON position and disconnect the relay ribbon cable.

Figure 1 - LM4L MVOLT Details

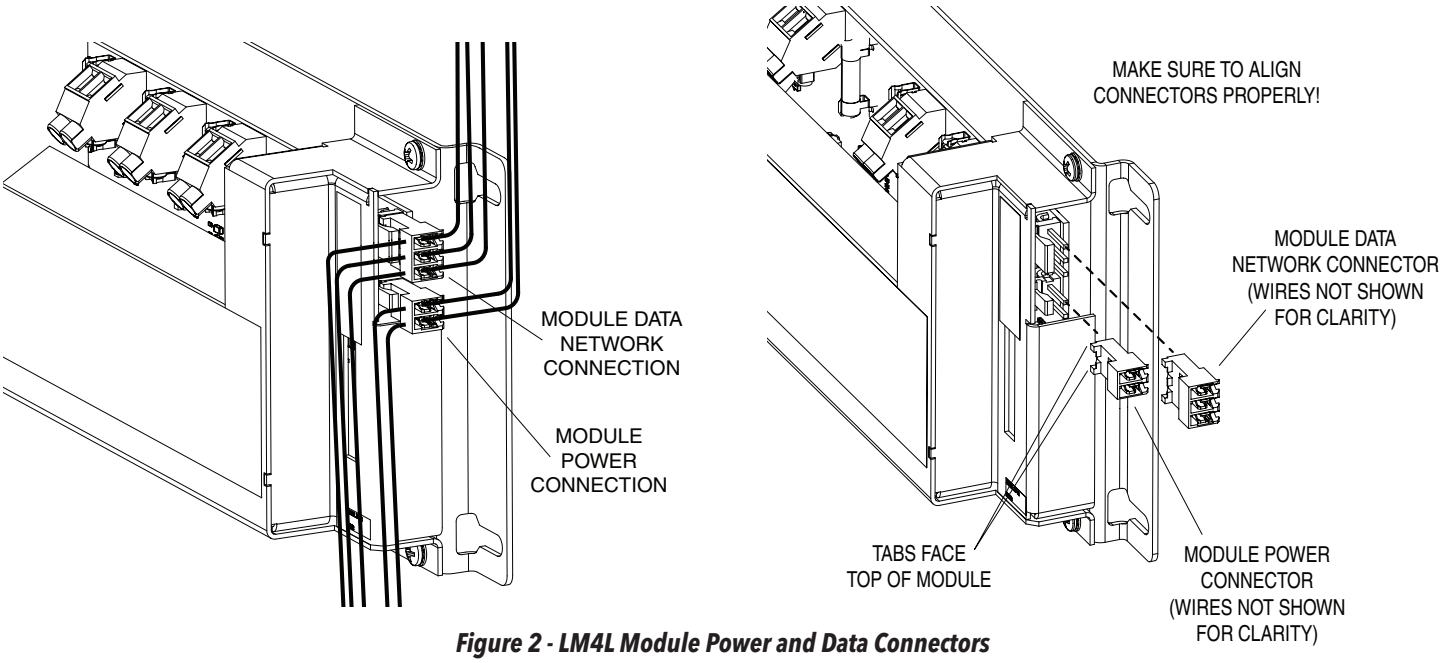

MODULE DATA NETWORK CONNECTION
MODULE POWER CONNECTION
MAKE SURE TO ALIGN CONNECTORS PROPERLY!
MODULE DATA NETWORK CONNECTOR (WIRES NOT SHOWN FOR CLARITY)
TABS FACE TOP OF MODULE
MODULE POWER CONNECTOR (WIRES NOT SHOWN FOR CLARITY)

Figure 2 - LM4L Module Power and Data Connectors

© 2014-2015 Acuity Brands Lighting, Inc. All rights reserved. 08/20/15

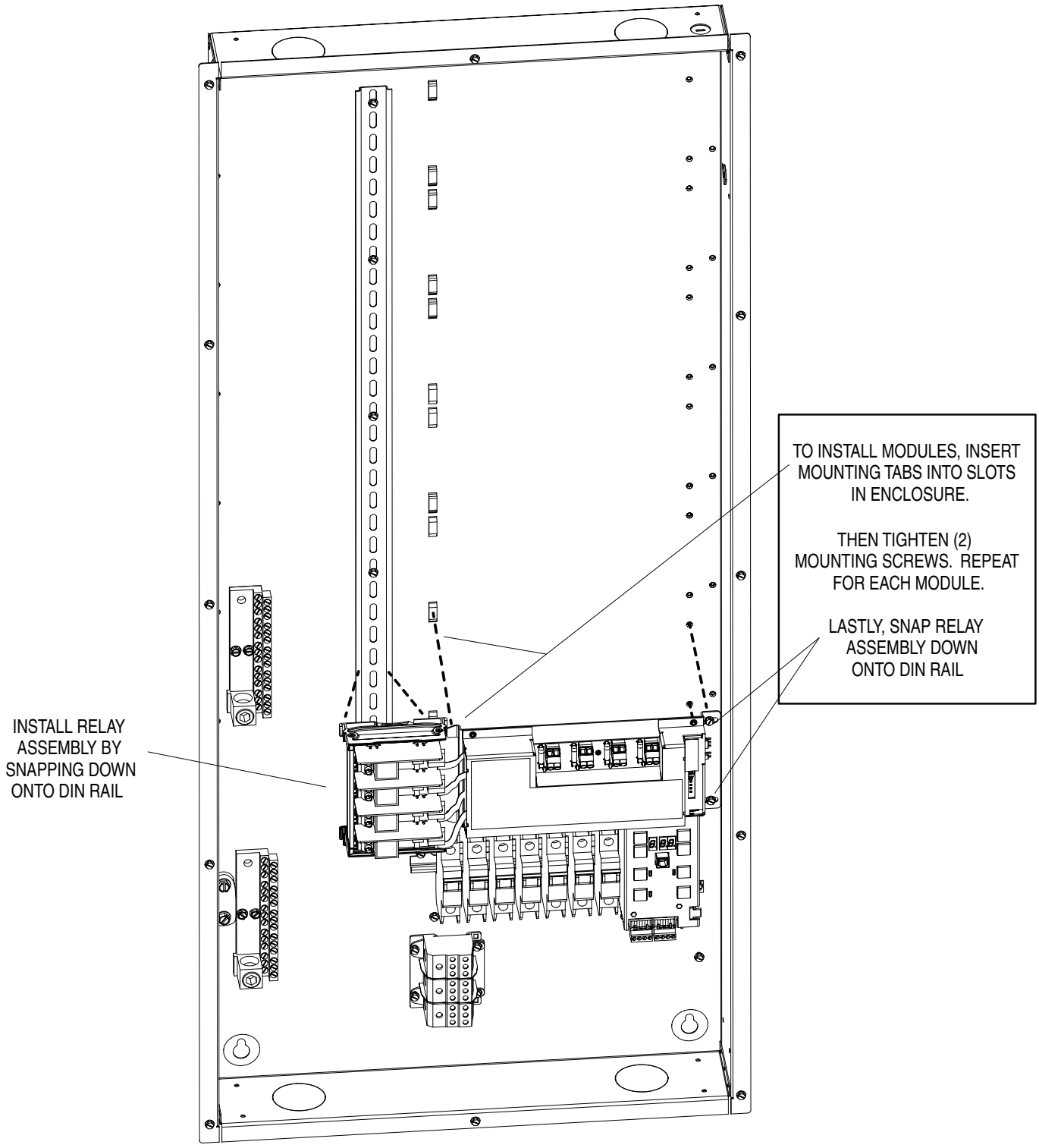

TO INSTALL MODULES, INSERT MOUNTING TABS INTO SLOTS IN ENCLOSURE.
THEN TIGHTEN (2) MOUNTING SCREWS. REPEAT FOR EACH MODULE.
LASTLY, SNAP RELAY ASSEMBLY DOWN ONTO DIN RAIL
INSTALL RELAY ASSEMBLY BY SNAPPING DOWN ONTO DIN RAIL

Figure 3 - LM4L Module Mounting

 © 2014-2015 Acuity Brands Lighting, Inc. All rights reserved. 08/20/15

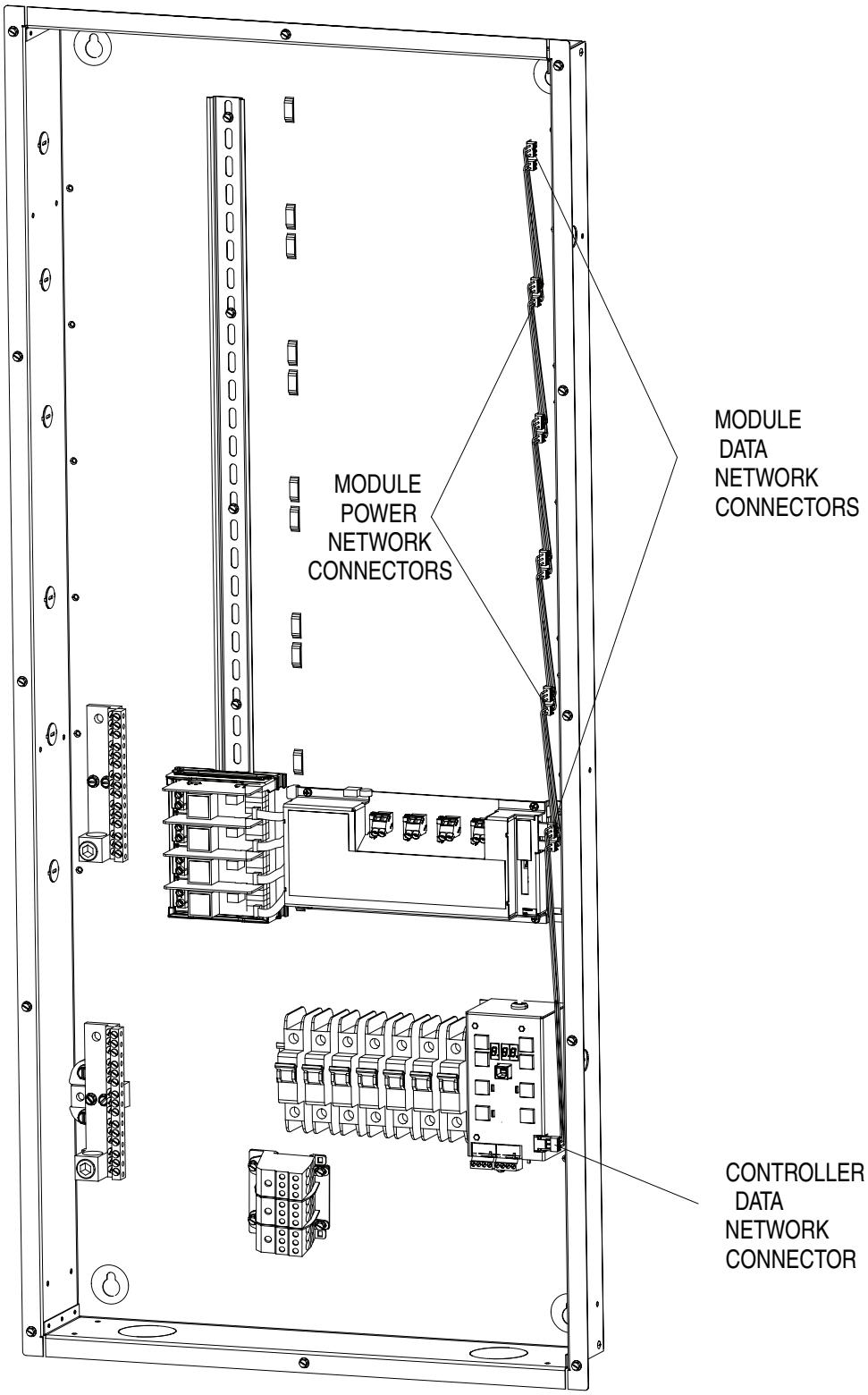


Figure 4 - Module Data and Power Network Connectors

 © 2014-2015 Acuity Brands Lighting, Inc. All rights reserved. 08/20/15

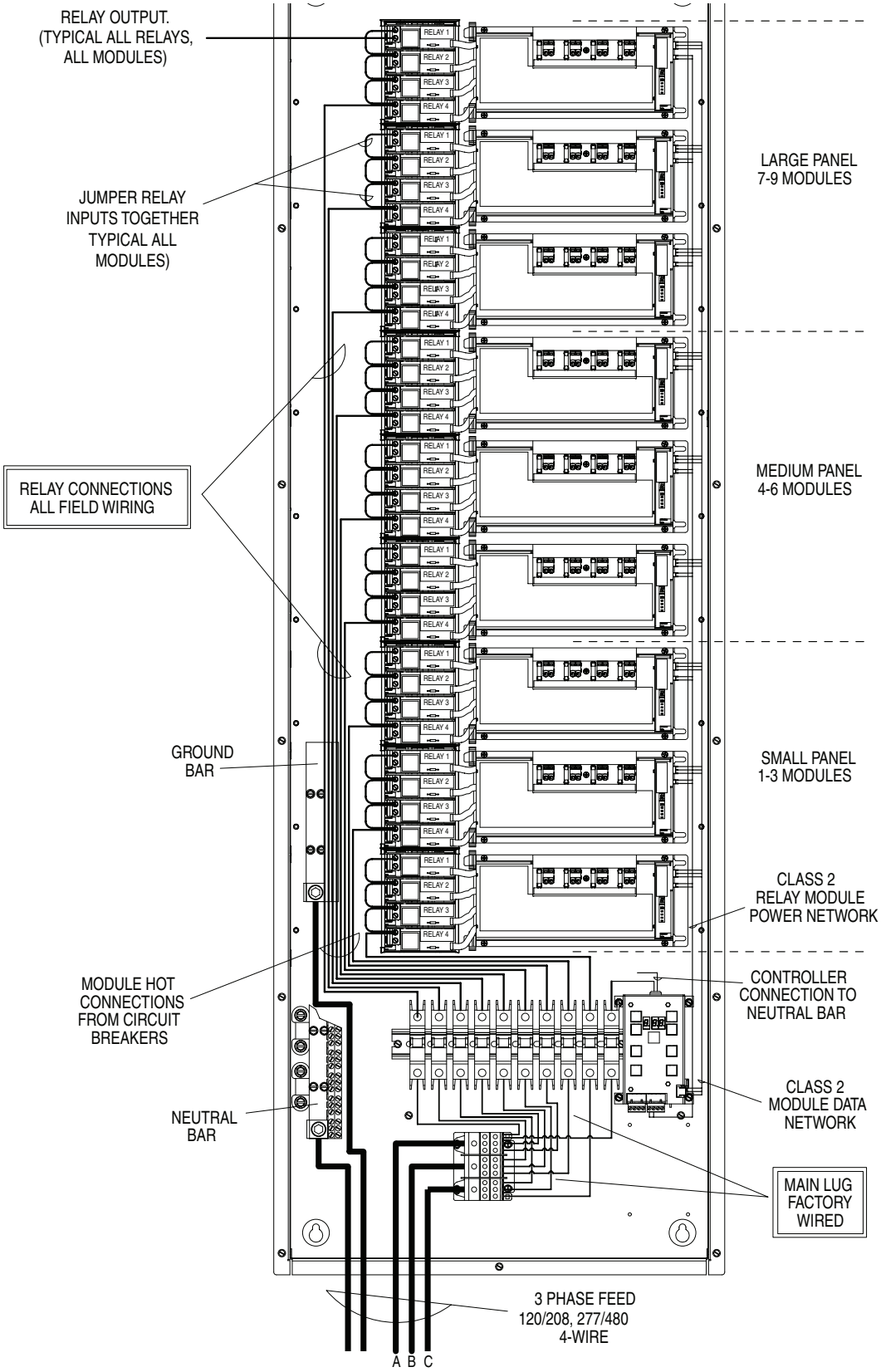


Figure 5 - LM4L MVOLT Relay Wiring Details - Main Lug Panel (LMP Circuit Breakers)

 © 2014-2015 Acuity Brands Lighting, Inc. All rights reserved. 08/20/15

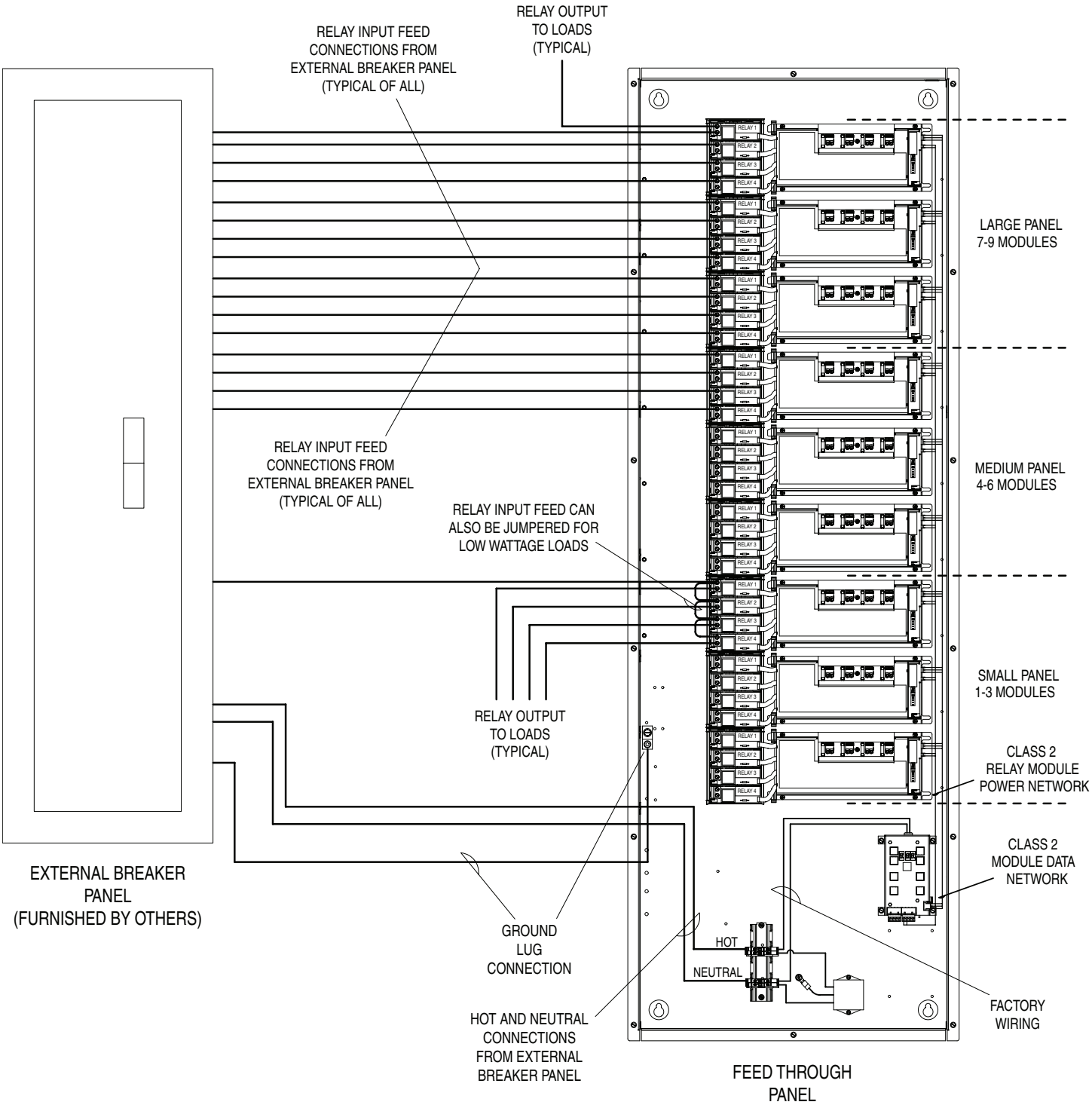

RELAY INPUT FEED CONNECTIONS FROM EXTERNAL BREAKER PANEL (TYPICAL OF ALL)
RELAY OUTPUT TO LOADS (TYPICAL)
LARGE PANEL 7-9 MODULES
MEDIUM PANEL 4-6 MODULES
SMALL PANEL 1-3 MODULES
RELAY INPUT FEED CONNECTIONS FROM EXTERNAL BREAKER PANEL (TYPICAL OF ALL)
RELAY INPUT FEED CAN ALSO BE JUMPERED FOR LOW WATTAGE LOADS
RELAY OUTPUT TO LOADS (TYPICAL)
CLASS 2 RELAY MODULE POWER NETWORK
CLASS 2 MODULE DATA NETWORK
EXTERNAL BREAKER PANEL (FURNISHED BY OTHERS)
GROUND LUG CONNECTION
HOT
NEUTRAL
FACTORY WIRING
HOT AND NEUTRAL CONNECTIONS FROM EXTERNAL BREAKER PANEL
FEED THROUGH PANEL

Figure 6 - LM4L MVOLT Relay Wiring Details -Feed Through Panel (External Breakers)

 © 2014-2015 Acuity Brands Lighting, Inc. All rights reserved. 08/20/15

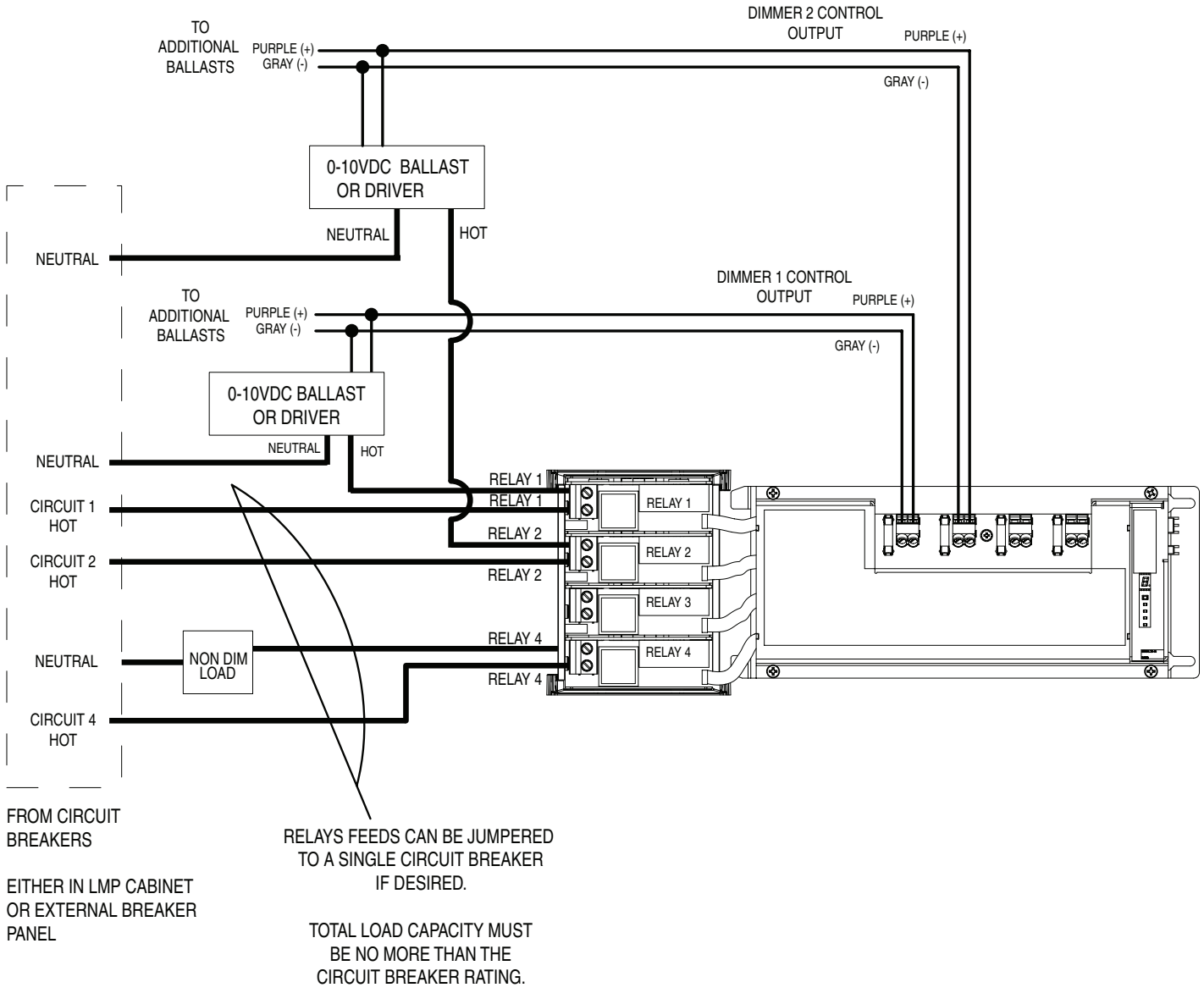


Figure 7 - LM4L MVOLT Load Wiring Details

 © 2014-2015 Acuity Brands Lighting, Inc. All rights reserved. 08/20/15

Troubleshooting		
7 Segment Display Error Code[1]:	Red Status LED:	Note: See additional notes below (2 & 3) for troubleshooting tips besides the listed error codes automatically detected by the module.
"E1"	Solid **Red**	**Error: Communication signal missing or distorted** 1. Check the communication wire harness connections and ensure that the plugs are fully inserted into the module and controller connectors. 2. Inspect the communication wires and repair or replace the wire harness if it is damaged. 3. Consult the factory for additional troubleshooting steps if the communication wires and connections appear OK.
"E2"		**Error: Brownout mode, input 24Vdc input voltage is too low** 1. Check the two position Class 2 power wire harness connections and ensure that the plug is fully inserted into the module and wires connected to the LMP Controller STATION NETWORK 24V output connector (red and black wire). 2. Measure the input voltage with the voltmeter on the LMP Controller STATION NETWORK output: it should within 5% of 24Vdc (22.8 to 25.2Vdc). 3. Inspect the LMP Controller to ensure it's ON; check the input circuit breaker (if provided in non-FT panel). 4. Consult the factory for additional troubleshooting steps if the power harness and 24V supply appear OK.
"E3"		**Error: The relay output(s) are overloaded, or output wiring or loads are shorted** 1. Disconnect each output from the relay cards and check for short circuits; correct any that are found before reconnecting the load circuit to the relay card terminal. 2. Measure the load current to verify that no individual relay card output is overloaded. Correct any overload condition by splitting up circuits which are too large onto multiple switched outputs.
"E4"		**Error: Module electronics failure** 1. Check the ambient temperature around the panel to verify that it is less than 400C. 2. Check if other modules inside the panel are overheating. 3. Consult the factory.

1. Note that "E" is flashing for 0.5s followed by "#" for 0.5 seconds.
2. Check the ribbon cables (from the relay controller to the relay cards) if the relay(s) are not actuating.
3. Check fuses on the 0-10V outputs (TB1-4) if 0-10V analog dimming outputs are not responding. Remove any miswire or faulty drivers/ballasts before replacing the fuses and reconnecting the 0-10V dimming wires.

 © 2014-2015 Acuity Brands Lighting, Inc. All rights reserved. 08/20/15